CP&L

Carolina Power & Light Company

P.O. Box 1551 • Raleigh, N.C. 27602

OCT 16 1991

SERIAL: NLS-91-260
10 CFR 50.90
TSC 91TSB11

G. E. VAUGHN
Vice President
Nuclear Services Department

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 & 50-324/LICENSE NOS. DPR-71 & DPR-62
REQUEST FOR LICENSE AMENDMENT
HIGH PRESSURE COOLANT INJECTION SYSTEM

Gentlemen:

In accordance with the Code of Federal Regulations, Title 10, Parts 50.90 and 2.101, Carolina Power & Light Company hereby requests a revision to the Technical Specifications for the Brunswick Steam Electric Plant (BSEP), Units 1 and 2.

The proposed change will increase the minimum pressure at which the High Pressure Coolant Injection (HPCI) system is required to be OPERABLE from greater than 113 psig to greater than 150 psig. The proposed change is being made to provide additional margin between the HPCI steam line low pressure isolation setpoint (presently established at greater than or equal to 100 psig) and the required HPCI availability pressure (presently established at greater than 113 psig).

Enclosure 1 provides a detailed description of the proposed changes and the basis for the changes.

In accordance with 10 CFR 50.91(a), Enclosure 2 details the basis for the Company's determination that the proposed changes do not involve a significant hazards consideration.

Enclosure 3 provides an environmental evaluation which demonstrates that the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental assessment needs to be prepared in connection with issuance of the amendment.

Enclosure 4 provides the proposed Technical Specification pages for Unit 1.

Enclosure 5 provides the proposed Technical Specification pages for Unit 2.

In accordance with 10 CFR 50.91(b), CP&L is providing the State of North Carolina with a copy of the proposed license amendment.

As described in Enclosure 1, the existing requirement that the HPCI system be OPERABLE prior to reactor pressure exceeding 113 psig can result in the reactor being maintained for an extended period of time (i.e., hours) at approximately 110 psig while attempting to place the HPCI system in service. Maintaining the reactor in stable condition in this operating condition for an extended period of time provides increased opportunities for inadvertent reactor scrams. In addition, the

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consequences of a control rod drop accident are the most severe when the reactor is operating in this pressure/temperature domain. These operational restrictions are typically encountered during the start-up process following an outage and during unit start-up following a scram. In order to allow CP&L to implement the proposed changes to resolve these operational issues as described herein, CP&L requests the NRC review the proposed license amendments as expeditiously as possible. In order to allow time for procedure revision and orderly incorporation into copies of the Technical Specifications, CP&L requests that the proposed amendments, once approved by the NRC, be issued with an effective date to be no later than 30 days from the issuance of the amendment.

Please refer any questions regarding this submittal to Mr. W. R. Murray at (919) 546-4661.

Yours very truly,

G. E. Vaughn

WRM/wrm (hpci-tsc.wpf)

Enclosures:

1. Basis for Change Request
2. 10 CFR 50.92 Evaluation
3. Environmental Considerations
4. Technical Specification Pages - Unit 1
5. Technical Specification Pages - Unit 2

cc: Mr. Dayne H. Brown
Mr. S. D. Ebneter
Mr. N. B. Le
Mr. R. L. Prevatte

G. E. Vaughn, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, contractors, and agents of Carolina Power & Light Company.

Eleanor C. Chappell
Notary (Seal)

ELEANOR C. CHAPPELL NOTARY PUBLIC WAKE COUNTY, N.C.

My commission expires: 2/6/96

ENCLOSURE 1

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
NRC DOCKET NOS. 50-325 & 50-324
OPERATING LICENSE NOS. DPR-71 & DPR-62
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BASIS FOR CHANGE REQUEST

Proposed Change:

Increase the minimum pressure at which the High Pressure Coolant Injection (HPCI) system is required to be OPERABLE from greater than 113 psig to greater than 150 psig.

Basis:

The proposed change will increase the minimum pressure at which the High Pressure Coolant Injection (HPCI) system is required to be OPERABLE from greater than 113 psig to greater than 150 psig. The proposed change is being made to provide additional operating margin between the HPCI steam line low pressure isolation setpoint, presently established at greater than or equal to 100 psig, and the required HPCI availability pressure, presently established at greater than 113 psig.

The primary purpose of the HPCI system is to maintain reactor vessel inventory after small breaks which do not depressurize the reactor vessel. As noted in Updated Final Safety Analysis Report (FSAR) Table 6.3.1-1, the HPCI system uses a single 100 percent capacity pump with a design flow of 4250 gallons per minute over a pressure range of 1120 psid (drywell to reactor vessel) to 150 psid (drywell to reactor vessel). Updated FSAR Section 6.3.2.2.1 describes the equipment and components that comprise the HPCI system.

Presently, Technical Specification 3.5.1 requires the HPCI system to be operable when reactor steam dome pressure is greater than 113 psig. The General Electric Company has indicated that the existing Technical Specification requirement that the HPCI system be OPERABLE when reactor pressure is greater than 113 psig is derived from early performance requirements for the Core Spray system. Originally, the maximum pressure at which the Core Spray system could adequately supply cooling water to all fuel assemblies at a conservative 1.5 heat transfer factor was 113 psig. The HPCI system was required OPERABLE when reactor pressure was greater than 113 psig to provide additional protection, even though rated flow could not be achieved when reactor pressure was less than 150 psig. Since that time, the Core Spray system has been demonstrated to provide adequate core cooling over a wider range of operating pressures; however, the Technical Specification requirements for HPCI system operability have never been revised to reflect this.

During reactor start-up, the HPCI system can be placed in service as required by the Technical Specifications after the HPCI low steam line pressure isolation switches, ASCO Tri-point type pressure switches, reset. These switches provide the HPCI steam supply pressure - low isolation signal and are required to have a setpoint of "greater than or equal to 100 psig" (see Technical Specification Table 3.3.2-2, Item 4.a.3). These ASCO Tri-point type pressure switches are required to reset before the HPCI system steam supply isolation valves can be opened. The actual as-installed setpoint for these pressure switches is established a few pounds above the required minimum pressure to allow for instrument drift and uncertainty. The resulting operating margin

between the actual as-installed instrument setpoint and the minimum pressure at which the HPCI system is required OPERABLE is less than 13 psig. The narrow operating margin between the HPCI low steam supply isolation setpoint and the minimum HPCI operability pressure results in several complications:

During plant start-up, these pressure switches may not reset in a timely manner, resulting in the reactor being maintained for an extended period of time (i.e., hours) at approximately 110 psig while awaiting completion of the special procedure used to reset the pressure switches. Maintaining the reactor in stable condition in this operating condition for an extended period of time provides increased opportunities for inadvertent reactor transients. In addition, the consequences of a control rod drop accident are the most severe when the reactor is operating in this pressure/temperature domain. NRC Inspection Report Nos. 50-325/91-18 and 50-324/91-18 dated August 12, 1991 discusses this operating experience.

The HPCI system has inadvertently isolated upon opening of the HPCI steam supply isolation valves. This isolation resulted from the sudden pressure decrease in the HPCI system steam line. This phenomenon has been discussed in CP&L Licensee Event Report 1-91-020 dated August 23, 1991.

Both of these operational problems could be avoided by increasing the operating margin between the actual as-installed instrument setpoint and the minimum pressure at which the HPCI system is required OPERABLE. After evaluating several alternatives, the Company determined the best overall method of correcting these operational restrictions would be to increase the minimum reactor pressure for HPCI system operability from greater than 113 psig to greater than 150 psig. This alternative is consistent with several other General Electric boiling water reactor facilities, such as Hatch, Fitzpatrick, Browns Ferry, Duane Arnold, Quad Cities, and Fermi 2, which have similar HPCI and low pressure cooling systems. These facilities require their HPCI systems to be operable prior to exceeding 150 psig. The other alternatives evaluated by the Company but not selected are summarized below:

One alternative considered was to reduce the HPCI system steam supply low pressure isolation setpoint from 100 psig to 50 psig. Lowering the HPCI system steam supply low pressure isolation setpoint would provide adequate operating margin relative to the minimum pressure required for HPCI system operability (i.e., the pressure switches would have sufficient margin to reset, thereby allowing the steam supply isolation valves to be opened without risk of reactor pressure dropping). The Company identified potential concerns with damaging the HPCI system turbine if the alternative associated with reducing the steam supply low pressure setpoint is adopted. Specifically, the potential exists for the HPCI turbine to stall on low differential pressure, which could result in turbine bearing or other internal component damage due to extended exposure to high temperature steam. Further analysis, and possibly testing, would be required to more adequately assess the potential for HPCI turbine stalling.

Another alternative considered was to allow the HPCI steam supply low pressure isolation circuit to be overridden during reactor start-up until a reactor steam dome pressure of 150 psig is reached. This alternative would allow the HPCI system steam supply isolation valves to be opened at any time during the reactor start-up process prior to the minimum HPCI operability pressure being reached. The override capability could be accomplished either through a plant modification installing an override circuit and control switch or possibly through the use of jumpers. This alternative was not selected to avoid placing another operational start-up task on the operators.

Adequate core cooling is required over the entire range of reactor coolant system operating pressures (i.e., from 0 psig to 1120 psig). Updated FSAR Table 6.3.3-1 summarizes the single failures and emergency core cooling systems available for a postulated loss of coolant accident. For each of the break locations analyzed, at least one alternate emergency core cooling system is available as a backup to the HPCI system.

As indicated in Updated FSAR Table 6.3.3-5, the HPCI system can inject a minimum of 4250 gpm over a system operating range of 150 psid to 1120 psid. In contrast, the Low Pressure Coolant Injection (LPCI) system can inject a minimum of 7000 gpm (one LPCI loop with two pumps injecting into one recirculation loop) with a reactor pressure of 150 psid or 3500 gpm (one LPCI loop with one pump injecting into one recirculation loop) with a reactor pressure of 150 psid. The LPCI system is capable of injection flow over a reactor pressure ranging from 0 psid up to 202 psid. In accordance with Technical Specification 3.5.3.2, the LPCI system is required OPERABLE when the unit is in OPERATIONAL CONDITIONS 1, 2,or 3, and in OPERATIONAL CONDITIONS 4 or 5 except when the Core Spray system is OPERABLE per Technical Specification 3.5.3.1. The Core Spray system can inject a minimum of 7000 gpm (two loop operation) or 3500 gpm (one loop operation) with a reactor pressure of 150 psid. The Core Spray system is capable of injection flow over a system operating range from 0 psid up to 265 psid. In accordance with Technical Specification 3.5.3.1, the Core Spray system is required OPERABLE in OPERATIONAL CONDITIONS 1, 2, 3, and 4, and in OPERATIONAL CONDITION 5 except when the reactor head is removed, the cavity flooded, the spent fuel gates removed, and reactor vessel water level maintained as required.

Summary:

Technical Specification 3.5.1 presently requires the HPCI system to be operable when reactor pressure is greater than 113 psig; however, in contrast, the minimum reactor pressure for HPCI rated flow is 150 psig. Based on the fact that (1) the HPCI system may not achieve rated flow at the present minimum pressure at which the system is required OPERABLE (113 psig) and (2) other backup core cooling systems (the LPCI and Core Spray systems) are required to be available and are capable of fulfilling their functions, the minimum pressure for the HPCI system operability should be revised to be consistent with the actual minimum reactor pressure at which rated HPCI system flow is designed to be achieved (150 psig). Increasing the minimum reactor pressure at which HPCI system operability is required to 150 psig will eliminate the current operational constraints that result from the narrow operating margin between the as-installed HPCI steam supply pressure - low isolation signal and the minimum HPCI system operability pressure. The ability to promptly place the HPCI system in service will minimize the amount of time the facility must remain in an operating region where the consequences of a postulated control rod drop accident would be the most significant.

ENCLOSURE 2

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
NRC DOCKET NOS. 50-325 & 50-324
OPERATING LICENSE NOS. DPR-71 & DPR-62
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10 CFR 50.92 EVALUATION

The Commission has provided standards in 10 CFR 50.92(c) for determining whether a significant hazards consideration exists. A proposed amendment to an operating license for a facility involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the possibility of a new or different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in a margin of safety. Pursuant to 10 CFR 50.91(a)(1), Carolina Power & Light Company has reviewed this proposed license amendment request and determined that its adoption would not involve a significant hazards consideration. The bases for this determination are as follows:

Proposed Change:

Increase the minimum pressure at which the High Pressure Coolant Injection (HPCI) system is required to be OPERABLE from greater than 113 psig to greater than 150 psig.

Basis:

The change does not involve a significant hazards consideration for the following reasons:

1. The proposed amendment does not involve a significant increase in the probability of an accident previously evaluated. Previously evaluated accidents related to the operation of the HPCI system which involve the potential for an increase in the probability of an accident are identified in Updated FSAR Sections 15.1.3 (subcooling) and 15.5.2 (increase reactor coolant inventory). These accidents involve inadvertent initiation of HPCI system operation and have no bearing on the reactor vessel pressure at which HPCI system operation is needed. The potential for an inadvertent initiation of the HPCI system will actually be reduced by increasing the minimum reactor vessel pressure at which the HPCI system is required to be operational. All other analyzed accidents do not involve the inadvertent initiation of the HPCI system. Therefore, the proposed change does not result in a significant increase in the probability of an accident previously evaluated.

   The proposed amendment does not involve a significant increase in the consequences of an accident previously evaluated. Previously evaluated accidents related to the operation of the HPCI system which involve the potential for an increase in the consequences in an accident are identified in Updated FSAR Sections 15.2.5 (loss of auxiliary power) and 15.2.6 (loss of feedwater). These accidents are assumed to occur at 100 percent power and have no bearing on the minimum reactor vessel pressure at which HPCI system operation is needed. Furthermore, increasing the minimum pressure above which HPCI system operability is required will not alter the availability of several systems which provide adequate alternate methods of backup reactor cooling. The Low Pressure Coolant

Injection (LPCI) system and the Core Spray system, both which are required to be OPERABLE when the unit is operating in OPERATIONAL CONDITIONS 1, 2, or 3, can also provide backup core cooling in the event of an accident when the reactor pressure is in the range from 0 psid up to 150 psid. Thus, increasing the minimum reactor pressure at which the HPCI system is required OPERABLE from greater than 113 psig to greater than 150 psig will not affect the availability of adequate backup core cooling capability. Therefore, the proposed change will not result in a significant increase in the consequences of an accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated. Increasing the minimum reactor pressure at which the HPCI system is required to be OPERABLE will not cause an unplanned initiation of the HPCI system or any other plant system or equipment, nor will the change impede the initiation of any required safety system(s). The HPCI system relies on the containment suppression pool, condensate storage tank, plant D.C. electrical system, and the reactor vessel low water level and drywell high pressure instrumentation to adequately operate. The proposed increase in minimum reactor pressure at which the HPCI system would be required OPERABLE will not affect the equipment of these systems, nor will the change affect the HPCI system itself. Therefore, no new or different kind of accident than that previously evaluated will be created.

3. The proposed amendment does not involve a significant reduction in the margin of safety. As stated in the Updated Final Safety Analysis Report, the HPCI system is designed to provide rated cooling water flow for reactor pressures ranging from 1120 psid to 150 psid. The HPCI system is not designed to provide rated cooling water flow at reactor pressures below 150 psig. At reactor operating pressures ranging from 0 psig to 150 psig, the Low Pressure Coolant Injection system and Core Spray system are intended to provide the backup capability to inject emergency core cooling water, if needed. Therefore, the proposed change to increase the minimum reactor pressure at which the HPCI system is required to be OPERABLE to greater than 150 psig will not significantly reduce the margin of safety.

ENCLOSURE 3

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
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ENVIRONMENTAL CONSIDERATIONS

10 CFR 51.22(c)(9) provides criterion for and identification of licensing and regulatory actions eligible for categorical exclusion from performing an environmental assessment. A proposed amendment to an operating license for a facility requires no environmental assessment if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant hazards consideration; (2) result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite; (3) result in an increase in individual or cumulative occupational radiation exposure. Carolina Power & Light Company has reviewed this request and determined that the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the issuance of the amendment. The basis for this determination follows:

Proposed Change:

Increase the minimum pressure at which the High Pressure Coolant Injection (HPCI) system is required to be OPERABLE from greater than 113 psig to greater than 150 psig.

Basis:

The change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) for the following reasons:

1. As demonstrated in Enclosure 2, the proposed amendment does not involve a significant hazards consideration.

2. The proposed amendment does not result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite. The HPCI system is designed to provide rated cooling water flow for reactor pressures ranging from 1120 psid to 150 psid. The HPCI system neither contributes to, nor controls, the types or amounts of any effluents released offsite. Therefore, the proposed increase in the minimum reactor pressure at which the HPCI system is required to be OPERABLE cannot affect the types or amounts of any effluents that may be released offsite.

3. The proposed amendment does not result in an increase in individual or cumulative occupational radiation exposure. Increasing the minimum pressure above which HPCI system operability is required will not alter the background radiation levels within the plant work areas to which access is needed to place the HPCI system in service. Therefore, the amount of individual or cumulative occupational radiation exposure will not be increased.